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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

Statistical Report of Surveys on Southern Oregon - Northern California Pine Beetle Control Project Area

During
Season 1929
" 1930

Statistical Report No. 8

By

F. P. Keen
Entomologist
U. S. Bureau of Entomology

501 Lewis Bldg.
Portland, Oregon

May 1, 1931

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Preface.

The annual surveys of the check sections established in the southern Oregon - northern California area were continued during 1929 and 1930. Due to the writer's absence for three months during the winter of 1929-30, the usual report was not issued last year and so the tabulations are included in this year's summary.

These statistical reports serve as a source of information on the losses which have been and are being sustained on this area due to the activity of the western pine beetle, and are a guide as to where control work should be done and indicate the results which have been obtained. They do not form a part of the research project for which the surveys are now largely being conducted. Reports covering the technical phases of such research projects will be issued separately.

Survey Personnel

The men employed on the survey work during the past two seasons were as follows:

	1929 Survey		1930 Survey	
	Mr. I. J. Hastings, in chg.		Mr. W.J.Buckhorn, in chg.	
	Wm. D. Bedard		Noel D. Wygant	
	Phillip C. Johnson		Alexis T. Kornouhoff	
Period of Survey:	June 15 - Sept. 16, 1929		June 15 - Sept. 16, 1930	
Cost: Salaries:	Regular	$420.00	Salaries: Reg.	$450.00
	Temporary	789.00	Temp.	550.00
		$1209.00		$ 1000.00
	Expenses	461.69	Expenses	466.38
	Total Cost	$1670.69	Total Cost	$ 1466.38
	Man Days	270	Man Days	246
	Cost per Man Day	$ 6.20	Cost per Man Day	$ 5.96
	Cost per acre cruised	$ .093	Cost Per A.cruised	$.084

Introduction

Since the surveys on the southern Oregon-northern California project area were started in 1921 the infestation of western pine beetle and the losses on these areas have gone through certain major fluctuations and changes.

Starting at a high point in 1918 the losses gradually diminished until 1923 when a low point was reached, then a steady yearly increase occurred until another high point was reached in 1926 when another drop occurred, thus completing what may be one phase of a cycle. However, it is too early to say whether we have an infestation cycle of regular periodicity or whether this one swing is correlated with climatic factors which may not occur again in exactly the same manner.

The chances are that no regular periodicity exists, for even on this one area certain units behaved very differently from the average, and while infestation was increasing in some places, it was decreasing in others.

The general tendency has been for an infestation to build up in a local unit until a very high percentage of the susceptible trees are killed. Then to move away from the old centers into stands which have not been so seriously depleted.

Resume' of Past Losses.

We now have a record of losses on this area covering a period of ten years, all of which have been based upon cruises of portions of the area. These losses are as follows:

Year	Volume Killed M. BM.	Average Percent of Stand Killed
1920	123,410	.97%
1921	119,705	.94%
1922	104,975	.82%
1923	74,426	.58%
1924	129,355	1.01%
1925	252,880	1.98%
1926	278,680	2.18%
1927	261,860	2.05%
1928	193,370	1.52%
1929	125,350	.98%
Ten Year Total	1,594,011	1.25%

As will be noted from the above table the heaviest losses, taking the area as a whole, occurred in 1926, even though some units continued to build up until 1928. Even the 1929 loss however, is still higher than the low point in 1923.

On the different areas the losses have fluctuated as follows:

Year	Volume Killed M. BM Area 1	Area 2	Area 3
1923	22,328	24,528	27,570
1924	39,895	52,380	37,080
1925	73,590	99,620	79,670
1926	52,550	119,680	106,450
1927	40,530	97,980	123,350
1928	33,880	76,090	83,400
1929	35,270	45,780	44,300

It is interesting to note that on Area 1 the peak of losses was reached in 1925, on Area 2 in 1926 and on Area 3 in 1927. The Modoc Area also reached its peak in 1927, and the big decline came between the summer and winter generations.

The reason for this difference in behavior on the different areas is hard to explain without recognizing the importance of local conditions. Weather conditions were similar throughout the entire region and the pattern of growth in tree rings is practically identical for all parts of the region. The rapid readjustment on Area 1 may have been due largely to the better site condition, greater vigor of the stand, and a consequent more rapid recovery from drought conditions. Areas 2 and 3 however, represent about the same average site, with perhaps area 3 somewhat better than 2. Here the importance of beetle population, the depletion of susceptible trees and the drift of infestation from old to new centers are undoubtedly important factors which have determined the trends. But we cannot overlook the control work which has obviously played a very important part in bringing about a decline sooner than otherwise might have occurred.

Present Situation

With a continuation of drought conditions in 1929, 1930 and 1931 the prospects are none too bright for additional decreases in the losses. In fact, increases have already occurred and the indications are that the attacks of 1930 would show a considerable increase over the previous year.

A heavy wind throw which occurred in April, 1931 will further complicate the situation and is apt to cause a concentration of infestation around these areas.

However, it seems highly improbable that the forests of this region can, at this time, again support as heavy losses as they have in the past decade- the stands are too badly thinned and too few trees of susceptible classes are left to be killed. However, losses may still be heavy and it will pay the owners to hold the bettle population to a minimum through control work, if valuable timber is to be saved.

On Area 1, barkbeetle losses on the Clover Station unit are particularly severe, and of epidemic character. This condition does not seem to be the result of the logging operation as the increase was particularly bad in section furthest away from the logging and started before the logging commenced.

The rest of the area is in fairly satisfactory shape; and marginal lands which have recently suffered heavy losses are now at a low ebb due to lack of susceptible trees. For instance, the Klamath Canyon check section, a typical poor quality marginal site which showed a loss of 167 trees in 1925, on a quarter section, only had 33 infested trees in 1929. The stand is so riddled that there is very little timber left to kill.

On Area 2 the losses have been generally declining. The heaviest centers have been covered with control work by the Indian Service and the Klamath Forest Protective Association. At this time the area as a whole appears to be in fairly satisfactory shape, but will need watching on account of the continued unfavorable climatic and growth conditions.

On Area 3 the heaviest losses are now occurring in the Quartz Valley unit. The Deming Creek unit also showed an increase along the western margin, and since a heavy blowdown has occurred recently in this unit, there is danger of a heavy increase of infestation during the coming year. Most of area showed a decline in losses for 1929 but with continued drought conditions an increase can be expected and indications are that it is already in progress.

Control Work Conducted.

During the fall of 1928 and spring of 1929, $57,611.10 was spent by the Indian Service, Forest Service and Klamath Forest Protective Association in control work on the areas. Most of this work was conducted in Area 2 and Area 3. On Area 2 the Indian Service treated the Sycan, Black Hills and Ferguson units. And on Area 3, the Meryl Creek, Horsefly, Whitworth and Owens units were treated by the Forest Service and the Association.

In the fall of 1929 and spring of 1930, the Indian Service and Klamath Forest Protective Association spent $46,080.21 in control work. Most of this work was concentrated on Area 2 on the Sycan, Black Hills, Ferguson, Bly, Willow Flat and Royston Units. The Whitworth Unit of Area 3 was also treated.

The detailed figures on this control work are given in the following tables:

Results of Control

All of the control work done during the two years 1927 and 1928 was directed against declining infestations, except on Area 1 where the untreated units in 1928 showed a slight increase over 1927. (See Table 1) The results secured, while apparently very satisfactory from the standpoint of the total reduction secured, only indicate that 26 per cent and 27 per cent reductions were obtained in excess of those recorded on untreated sections. As has been frequently pointed out, the greatest value from control work can be obtained only when it is directed against an increasing infestation, when obviously Nature's control is ineffective.

However, the control work which has been done in the southern Oregon region during the past decade, has undoubtedly saved an immense amount of timber from destruction by the barkbeetles. If the work is continued until climate and growth conditions return to normal, the ultimate returns from the work will be fully worth the money which has been spent in the protection work. It is highly improbable that the present drought cycle can last much longer.

Future Control Work

The most effective time to control is during an increase in bettle population and particularly at the beginning of such an increase.

Since all indications point toward an increase in losses for the coming year, it is recommended that areas be closely watched this summer for signs of concentrating bettle attacks and that control be undertaken in the fall on all areas needing protection and valuable enough to warrant the cost of the work.

Areas to be particularly watched are as follows:-

Area 1 - Jenny Creek, Johnson Prairie, Pokegama and uncut portion of Clover Station.

Area 2 - Areas of high hazard have recently been cleaned so that no particular areas need special attention.

Area 3 - Deming Creek, Quartz Valley.

TABLE 1.

Results of Control.

1927 Control Work

Area	Sections	1927 Loss	1928 Loss	Increase %	Decrease %	Net Decrease Thru Control
1	7 Untreated	1108	1243	12		
	2 Treated	431	258		40	52%
2	8 Untreated	3887	3115		20	
3	9 Untreated	4951	3307		33	
	4 Treated	1881	922		51	18%
Total	24 Untreated	9946	7665		23	
	6 Treated	2312	1180		49	26%

1928 Control Work.

Area	Sections	1928 Loss	1929 Loss	Increase %	Decrease %	Net Decrease From Control
1	8 Untreated	1158	1123		3	
	1 Treated	343	219		36	33%
2	6 Untreated	2244	1090		51	
	2 Treated	861	382		56	5%
3	9 Untreated	2084	1463		30	
	3 Treated	1675	534		68	38%
Total	23 Untreated	5486	3676		33	27%
	6 Treated	2879	1135		60	

TABLE 2.

Survey of 1929.

Summary of Cruising Data on Check Sections

Area 1.

Unit	Location			Acres	Date Cruise	1927 Loss				1928 Loss				Remarks
						Total Trees Marked				Total Trees Marked				
	T	R	Sec.		1929	KS	KW	Trtd	Total	LS	LW	Trtd.	Total	
Aspen Lake	37S	7E	34	640	7/8	41	34	-	75	67	66	-	133	
Clover Sta.	38S	6E	36	640	7/2	100	111	-	211	159	168	-	327	
" "	39S	7E	16	640	7/5	155	137	-	292	148	64	131	343	Logged to mill
Eagle Ridge	37S	7E	16	640	7/10	82	83	-	165	65	63	-	128	
Jenny Creek	40S	4E	34	640	7/19	114	14	35	163	45	56	-	101	
Johnson Prairie	39S	5E	7	640	7/17	39	15	-	54	69	37	-	106	
Klamath Canyon	41S	6E	9	160	7/16	75	64	-	139	35	27	-	62	
Pokegama	40S	5E	36	640	7/22	152	35	81	268	60	97	-	157	
Round Lake	39S	8E	5	640	7/12	110	62	-	172	82	62	-	144	
Totals				5280		868	555	116	1539	730	640	131	1501	

TABLE 3.

Survey of 1929.

Summary of Cruising Data on Check Sections

Area 2

Unit	Location T	Location R	Location Sec	Acres	Date of Cruise 1929	Total Trees Marked: 1927 Loss KS	1927 Loss KW	1927 Loss Trtd	1927 Loss Total	1928 Loss LS	1928 Loss LW	1928 Loss Trtd	1928 Loss Total	Remarks
Antelope	36S	8E	28	640	7/25	133	165	-	298	150	87	-	237	
Chiloquin	35S	7E	24	640	7/29	50	58	-	108	43	69	-	112	
Ferguson	35S	13E	33	640	8/2	305	181	-	486	160	34	139	333	Treated in Spring 1929
Gerber	38S	13E	24	640	8/29	199	311	-	510	560	155	-	715	Burned in Oct. 1927
Goodlowe	39S	13E	5	640	8/27	99	163	-	262	188	90	-	278	
Royston	38S	12E	10	640	8/22	144	159	-	303	179	95	-	274	
Sycan	34S	12E	2	640	7/31	600	386	-	986	335	13	190	538	Treated in Spring
Willow Flat	37S	14E	20	640	8/20	471	463	-	934	448	180	-	628	
Total				5120		2001	1886	-	3887	2063	723	329	3115	

TABLE 4.
Survey of 1929

SUMMARY OF CRUISING DATA ON CHECK SECTIONS

Area 3.

Unit	Location T	Location R	Location Sec	Acres	Date of Cruise 1929	Total Trees Marked: 1927 Loss KS	1927 Loss KW	1927 Loss Trtd	1927 Loss Total	1928 Loss LS	1928 Loss LW	1928 Loss Trtd	1928 Loss Total	Remarks
Crowder Flat	47N	11E	18	640	6/25	476	560	-	1036	242	169	-	411	
" "	47N	12E	4	640	6/27	67	66	-	133	58	73	-	131	
Deming Creek	36S	15E	8	640	8/14	191	58	181	430	136	77	-	213	
" "	36S	15E	25	640	8/16	149	29	118	296	145	69	-	214	
Horsefly	38S	14E	13	640	9/4	387	304	-	691	289	41	106	436	
"	38S	14E	36	640	8/31	638	678	-	1316	575	72	226	873	
Merritt Creek	33S	14E	34	640	8/6	102	107	-	209	86	48	-	134	
Meryl Creek	35S	14E	11	640	8/8	265	342	-	607	288	23	169	480	
" "	35S	15E	20	640	8/12	215	252	-	467	171	36	114	321	
Owens	38S	15E	1	640	9/16	111	18	78	207	59	26	-	85	
Quartz Valley	38S	17E	7 E½	320	9/14	119	100	-	219	98	90	-	188	
" "	38S	17E	8 W½	320	9/12	99	174	-	273	139	159	-	298	
Whitworth Creek	37S	16E	17	640	9/10	433	77	438	948	207	203	-	410	
Total				7680		3252	2765	815	6832	2493	1086	615	4194	

TABLE 5.

SUMMARY OF YELLOW PINE LOSSES FOR 1928

Area 1

Unit	No. of trees Killed	Average Volume per Tree	Volume M.B.M.	Stumpage Value	Value of Loss	% of Stand Killed	Loss per A. Bd.Ft.	Average No. Trees Killed per section	Treated Loss of
Aspen Lake	3,700	1,000	3,700	$ 6.50	24,050	1.36	218	140	'21,'22,'26 '28
*Big Bend	800	1,000	800	6.50	5,200	1.16	109	70	'21, '23
*Chase Butte	1,600	1,000	1,600	5.50	8,800	1.24	139	89	'22, '26
Clover Sta.	11,000	800	8,800	6.50	57,200	1.27	169	136	'22, '24, '25,'26,'28
Eagle Ridge	2,300	1,000	2,300	7.50	17,250	1.18	128	82	'21, '26
Jenny Creek	2,400	800	1,920	5.50	10,560	.51	42	34	'22, '27
Johnson Prairie	4,000	1,200	4,800	5.50	26,400	.79	100	53	'26
Klamath Canyon	1,000	500	500	3.50	1,750	.85	44	57	'23
Pokegama	5,200	800	4,160	5.50	22,880	.53	85	68	'22, '27
Round Lake	2,500	1,000	2,500	6.50	16,250	1.12	136	87	'21, '22, '26
*Topsy	2,500	800	2,000	6.50	13,000	.79	79	63	'23
*Worden	1,000	800	800	5.50	4,400	1.25	107	86	'23
Total	38,000	890	33,880	6.12	$207,740	.91	109	78	

* Estimated but not cruised.

TABLE 6

SUMMARY OF YELLOW PINE LOSSES FOR 1928

Area 2

Unit	No. of Trees Killed	Average Volume per Tree	Volume Killed M.B.M.	Stumpage Value	Value of Loss	% of Stand Killed	Loss per A. Bd.Ft.	Average No. Trees Killed per section	Treated Loss of
*Algoma	1,200	800	960	5.50	5,280	2.21	111	90	'21
Antelope	4,000	800	3,200	5.50	17,600	.98	128	102	'22
Black Hills	14,500	700	10,150	4.50	45,675	1.91	272	248	'23, '28
*Bly	7,000	700	4,900	5.00	24,500	1.86	175	160	
Chiloquin	2,000	300	600	5.50	3,300	.27	28	59	'22
Ferguson	2,600	700	1,820	4.50	8,190	1.63	161	148	'23, '28
Gerber	2,300	500	1,150	4.00	4,600	3.68	202	258	
Goodlowe	4,400	500	2,200	4.00	8,800	2.92	179	229	
*Hildebrand	3,000	600	1,800	5.50	9,900	1.05	106	113	'23
*Rock Canyon	4,000	600	2,400	5.00	12,000	1.55	197	210	'23
Royston	5,000	600	3,000	4.50	13,500	1.75	247	263	'23
*Saddle Mt.	7,000	700	4,900	5.50	26,950	1.23	124	114	'22
*Shoner	1,200	500	600	5.50	3,300	.57	48	62	'21
*Sprague	1,000	400	400	6.50	2,600	.65	75	119	'22
*Squaw Flat	2,800	700	1,960	5.50	10,780	1.13	125	114	'22
*Swan	2,500	700	1,750	5.50	9,625	1.21	119	109	'21
Sycan	17,500	800	14,000	4.00	56,000	2.50	350	279	'24
*Trout Creek	6,000	700	4,200	5.50	23,100	1.17	122	112	'22
*Whiskey Creek	5,000	700	3,500	5.00	17,500	1.13	139	128	'23
Willow Flat	14,000	750	10,500	5.00	52,500	2.71	322	274	'23
*Yainax	3,000	700	2,100	5.50	11,550	1.11	133	122	'23
Total	110,000	690	76,090	$4.82	367,250	1.59	179	165	

*Estimated but not cruised.

TABLE 7

SUMMARY OF YELLOW PINE LOSSES FOR 1928

Area 3

Unit	No. of Trees Killed	Average Volume per Tree	Volume Killed M.B.M.	Stumpage Value	Value of Loss	% of Stand Killed	Loss per A. Bd.Ft.	Average No Trees Killed per section	Treated Loss of
*Barnes Valley	8,000	800	6,400	$ 3.50	$ 22,400	1.90	147	118	
Crowder Flat	13,000	1,000	13,000	4.00	52,000	1.48	143	91	'22,'23
Deming Creek	5,500	800	4,400	5.00	22,000	1.85	133	106	'22,'24,'27
*Dog Lake	6,500	800	5,200	3.50	18,200	1.35	98	78	
*Four Mile	4,000	900	3,600	3.50	12,600	1.17	93	66	
*Hay Creek	3,000	800	2,400	3.50	8,400	1.30	126	101	
Horsefly	15,000	800	12,000	5.00	60,000	4.05	298	239	'21,'22,'23,'28
Merritt Creek	2,500	1,000	2,500	4.00	10,000	1.74	115	73	
Meryl Creek	13,000	900	11,700	5.00	58,500	2.28	185	131	'22, '28
Owens	5,500	1,000	5,500	5.00	27,500	1.68	144	92	'22,'23, '27,'28
Quartz Valley	11,500	800	9,200	4.50	41,400	3.10	274	219	'23, '27,'28
*Scab Rock	6,000	800	4,800	3.50	16,800	3.25	245	196	
Whitworth	4,500	600	2,700	5.00	13,500	1.48	79	84	'22,'27,'28
Total	98,000	850	83,400	$ 4.35	$363,300	1.97	157	118	

*Estimated but not cruised.

TABLE 8

Project Totals

SUMMARY OF YELLOW PINE LOSS FOR 1928

ITEMS	Area 1	Area 2	Area 3	Total
Number of Trees Killed	38,000	110,000	98,000	246,000
Average Volume Per Tree	890	690	850	785
Volume Killed (M.B.M.)	33,880	76,090	83,400	193,370
Average value per M.B.M.'	$6.12	$4.82	$4.36	$4.85
Value of stumpage lost	$207,740	$367,250	$363,300	$ 938,290
Percent of stand killed	.91%	1.59%	1.97%	1.52%
Loss in board feet per acre	109	179	157	153
Average number of trees killed per section	78	165	118	124

TABLE 9.

CONTROL WORK CONDUCTED DURING PERIOD

Fall 1928 - Spring 1929

Area	Units Treated	Control Period	Trees Treated	Volume Treated M.B.M.	Acres Covered	Cost.	Worked by
1	Clover Sta.	Spring 1929	466	603	2,780	$3,194.47*	Weyerhaeuser Timber Co
1	Aspen Lake	Spring 1929	139	347	1,000	$ 685.13	Klamath Forest Protective Assn.
2	Sycan Black Hills Ferguson	Fall 1928 Spring 1929	2,191 4,828	1,750* 3,860*	36,560	$22,931.36	Indian Service
3	Horsefly	Spring 1929	2,751	2,986	10,600	$ 8,764.37	K.F.P.A.
	"	Spring 1929	1,600	1,360*	5,920	$ 6,158.54	Forest Service
3	Meryl	Fall 1928	1,896	3,365	10,960	7,071.75	K.F.P.A.
	"	Spring 1929	1,307	1,236	9,640	4,144.48	"
3	Whitworth Quartz Owens	Fall 1928	1,078	817	9,440	4,661.00	Forest Service
	Total		16,256	16,324	86,900	$ 57,611.10	

*Estimate - but approximately correct.

TABLE 10.
Survey of 1930

SUMMARY OF CRUISING DATA ON CHECK SECTIONS

Area 1

Unit	Location			Acres	Date Cruise 1930	1928 Loss Total Trees Marked				1929 Loss Total Trees Marked				Increase %	Decrease %
	T	R	Sec			LS	LW	Trtd	Total	MS	MW	Trtd	Total		
Aspen Lake	37S	7E	34	640	7/2	67	66	-	133	38	35	-	73		45%
Clover Sta.	38S	6E	36	640	6/28	159	168	-	327	167	304	-	471	44%	
" "	39S	7E	16	640	6/27	148	64	131	343	86	55	78	219		36%
Eagle Ridge	37S	7E	16	640	7/3	65	63	-	128	62	68	-	130	2%	
Jenny Creek	40S	4E	34	640	6/21	45	56	-	101	43	42	-	85		15%
Johnson Prairie	39S	5E	7	640	6/18	69	37	-	106	20	71	-	91		8%
Klamath Canyon	41S	6E	9	160	6/26	35	27	-	62	15	18	-	33		47%
Pokegama	40S	5E	36	640	6/24	60	97	-	157	61	60	-	121		23%
Round Lake	39S	8E	5	640	7/7	82	62		144	48	71	-	119		17%
Totals				5280		730	771	131	1501	540	724	78	1342		11%

TABLE 11
Survey of 1930

SUMMARY OF CRUISING DATA ON CHECK SECTIONS

Area 2.

Unit	Location				Date of Cruise 1930	Total Trees Marked								Increase or Decrease	
						1928 Loss				1929 Loss					
	T	R	Sec.			LS	LW	Trtd.	Total	MS	MW	Trtd.	Total	Plus	Minus
Antelope	36S	8E	28	640	7/9	150	87	-	237	110	101	-	211		11%
Chiloquin	35S	7E	24	640	7/11	43	69	-	112	61	60	-	121	8	
Ferguson	35S	13E	33	640	7/16	156	34	139	329	116	107	-	223		32
Gerber	38S	13E	24	640	7/26	560	155	-	715	110	73	-	183		74
Goodlowe	39S	13E	5	640	7/24	188	90	-	278	70	59	-	129		54
Royston	38S	12E	10	640	7/21	179	95	-	274	77	30	57	164		40
Sycan	34S	12E	2	640	7/14	329	13	190	532	96	63	-	159		70
Willow Flat	37S	14E	20	640	7/18	448	180	-	628	167	115	-	282		55
Totals				5120		2053	723	329	3105	807	608	57	1472		53

TABLE 12.
Survey of 1930

SUMMARY OF CRUISING DATA ON CHECK SECTIONS

Area 3

Unit	Location			Acres	Date of Cruise	Total Trees Marked								Increase or Decrease	
						1928 Loss				1929 Loss					
	T	R	Sec		1930	LS	LW	Trtd	Total	MS	MW	Trtd	Total	Plus	Minus
Crowder Flat	47N	11E	18	640	8/25	242	169	-	411	90	64	-	154		63%
" "	47N	12E	4	640	8/23	58	73	-	131	25	31	-	56		57
Deming Creek	36S	15E	8	640	8/11	136	77	-	213	104	151	-	255	20	
" "	36S	15E	25	640	8/13	145	69	-	214	50	68	-	118		45
Horsefly	38S	14E	36	640	7/29	553	95	226	874	108	118	-	226		74
Merritt Creek	33S	14E	34	640	8/1	86	48	-	134	54	68	-	122		9
Meryl Creek	35S	14E	11	640	8/4	264	23	193	480	90	80	-	170		65
" "	35S	15E	20	640	8/7	160	36	125	321	63	75	-	138		57
Owens	38S	15E	1	640	8/15	59	26	-	85	30	47	-	77		9
Quartz Valley	38S	17E	7E½	320	8/20	98	90	-	188	32	78	-	110		42
" "	38S	17E	8W½	320	8/21	139	159	-	298	64	149	-	213		28
Whitworth Creek	37S	16E	17	640	8/18	207	203	-	410	74	142	142	358		13
Totals				7040		2147	1068	544	3759	784	1071	142	1997		47

TABLE 13.

SUMMARY OF YELLOW PINE LOSSES FOR 1929

Area 1

Unit	Number Trees Killed	Av. Vol. per Tree	Volume Killed M.B.M.	Stumpage Value	Value of Loss	% of Stand Killed	Loss per A. Bd. ft.	Average No. Trees Killed per Section	Treated Loss of
Aspen Lake	2,000	900	1,800	$6.00	$ 10,800	.66	106	75	'21,'22,'26
*Big Bend	800	1000	800	5.00	4,000	1.16	109	70	'22,'23
*Chase Butte	1,400	1000	1,400	4.00	5,600	1.08	121	78	'22,'26
Clover Sta.	12,500	800	10,000	6.00	60,000	1.68	193	154	'22,'24,'25,'26,'28,'29
Eagle Ridge	2,300	1000	2,300	7.00	16,100	1.18	128	82	'21,'26
Jenny Creek	2,700	900	2,430	5.00	12,150	.65	53	38	'22,'27
Johnson Prairie	4,500	1400	6,300	5.00	31,500	1.04	131	60	'26
Klamath Canyon	900	400	360	3.00	1,080	.61	32	51	'23
Pokegama	5,200	1000	5,200	5.00	26,000	.66	106	68	'22,'27
Round Lake	2,200	1000	2,200	6.00	13,200	.99	120	77	'21,22,'26
*Topsy	2,200	800	1,760	5.00	8,800	.70	69	55	'23
*Worden	900	800	720	4.00	2,880	1.13	96	77	'23
Totals,	37,600	940	35,270	$4.65	$163,760	.95	113	77	

*Estimated but not cruised.

TABLE 14

SUMMARY OF YELLOW PINE LOSSES FOR 1929

Area 2

Unit	Number Trees Killed	Av. Vol. per Tree	Volume Killed M.B.M.	Stumpage Value	Value of Loss	% of Stand Killed	Loss per A Bd. ft.	Average No. Trees Killed per Section	Treated Loss of
*Algoma	600	700	420	$5.00	$ 2,100	.97	49	45	'21
Antelope ½	5,000	700	3,500	5.00	17,500	1.07	140	128	'22
Black Hills —	8,000	700	5,600	4.00	22,400	1.05	150	137	'23,'28,'29
Bly —	8,800	700	6,160	5.00	30,800	2.34	221	201	'29
Chiloquin —	2,500	200	500	5.00	2,500	.23	23	74	'22
Ferguson —	1,700	700	1,190	4.00	4,760	1.06	105	96	'23,'28,'29
Gerber	700	700	490	3.50	1,715	1.62	86	79	
Goodlowe	2,200	600	1,320	3.50	4,620	1.75	107	115	'29
*Hildebrand	1,500	700	1,050	5.00	5,250	.61	61	56	'23
*Rock Canyon	2,000	700	1,400	4.00	5,600	.91	115	105	'23
Royston	3,300	700	2,310	4.00	9,240	1.35	190	173	'23, '29
Saddle Mt. —	4,800	700	3,360	5.00	16,800	.84	85	78	'22
*Shoner	800	600	480	5.00	2,400	.46	39	41	'21
Sprague —	1,200	400	480	6.00	2,880	.78	89	143	'22
*Squaw Flat	1,400	800	1,120	5.00	5,600	.64	71	57	'22
* Swan	1,000	800	800	5.00	4,000	.56	55	43	'21
Sycan —	7,000	800	5,600	3.50	19,600	1.00	140	112	'24, 29
*Trout Creek —	3,000	800	2,400	5.00	12,000	.67	70	56	'22
*Whiskey Creek	2,500	800	2,000	5.00	10,000	.65	79	64	'23
Willow Flat	6,000	800	4,800	5.00	24,000	1.24	147	118	'23,'29
*Yainax —	1,000	800	800	5.00	4,000	.42	51	41	'23
Totals	65,000	705	45,780	$ 4.55	$207,765	.96	107	98	

*Estimated but not cruised.

Cruised 22,000

TABLE 15.

SUMMARY OF YELLOW PINE LOSSES FOR 1929

Area 3.

Unit	No. of Trees Killed	Average Volume per Tree	Volume Killed: M.B.M.	Stumpage Value	Value of Loss	% of Stand Killed	Loss per A. Bd.ft.	Average No. Trees Killed per section	Treated Loss of
*Barnes Valley	3,500	800	2,800	$3.00	$ 8,400	.83	64	52	
Crowder Flat	6,000	1000	6,000	4.00	24,000	.68	66	42	'22,'23
Deming Creek	4,000	900	3,600	5.00	18,000	1.52	108	77	'22,'24,'27
*Dog Lake	3,500	800	2,800	3.00	8,400	.72	53	42	
*Four Mile	2,000	900	1,800	3.00	5,400	.58	47	33	
*Hay Creek	1,500	800	1,200	3.00	3,600	.65	63	50	
Horsefly	5,000	900	4,500	5.00	22,500	1.52	111	80	'21,'22,'23,'28
Merritt Creek	2,000	1000	2,000	4.00	8,000	1.39	92	59	
Meryl Creek	5,000	1000	5,000	5.00	25,000	.98	79	50	'22, '28
Owens	4,000	1000	4,000	5.00	20,000	1.22	104	67	'21,'23,'27,'28
Quartz Valley	6,000	900	5,400	5.00	27,000	1.82	161	114	'23,'27,'28
*Scab Rock	2,500	800	2,000	3.00	6,000	1.35	102	82	
Whitworth	4,000	800	3,200	5.00	16,000	1.76	94	75	'23,'27,'28; '29
Totals.	49,000	905	44,300	$4.35	$192,300	1.05	84	59	

*Estimated but not cruised
Figures indicate years in which loss was treated

TABLE 16.

Project Totals

SUMMARY OF YELLOW PINE LOSS FOR 1929

Items	Area 1	Area 2	Area 3	Total
Number of trees killed	37,600	65,000	49,000	151,600
Average volume per tree	940	705	905	830
Volume Killed (M.B.M.)	35,270	45,780	44,300	125,350
Average value per M.B.M.	$4.65	$4.55	$4.35	$4.50
Value of Stumpage lost.	$163,760	$207,765	$ 192,300	$ 563,825
Per cent of stand killed	.95%	.96%	1.05%	.98%
Loss in board feet per acre	113	107	84	99
Average number of trees killed per section	77	98	59	76

TABLE 17

CONTROL CONDUCTED DURING PERIOD

Fall 1929 - Spring 1930

Area	Unit Treated	Control period	Trees treated	Volume Treated M.B.M.	Acres Covered	Cost	Work done by
1	Clover	Spring 1930	1200*	1,000*	10,000*	$ 5,000.00	(Logged) Weyerhaeuser Timber Co.
1	Jenny Creek Johnson Prairie	Spring 1930	197	302	1,000	637.04	Klamath Falls Prot.Assn.
2	Sycan Black Hills Ferguson	Fall 1929	1,527 1,925 155	2,900*	34,560	18,322.35	Indian Service
2	Willow Flat Royston	Fall 1929	1,612 347	2,105	15,240	5,956.96	K.F.P.A.
2	Bly	Spring 1930	2,477	2,000*	8,850	7,874.36	Indian Service
2	Royston Goodlowe	Spring 1930	570 163	590 170	7,160	$ 3,780.00	K.F.P.A.
3	Whitworth	Spring 1930	876	910	6,040	4,509.50	K.F.P.A.
	Total		11,049	9,977	82,850	$46,080.21	

*Estimated but approximately correct.